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**west virginia** department of environmental protection

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Office of Oil and Gas  
601 57th Street SE  
Charleston, WV 25304  
(304) 926-0450  
(304) 926-0452 fax

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

June 05, 2013

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-1706244, issued to ANTERO RESOURCES APPALACHIAN CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin  
Chief

Operator's Well No: DOROTHY UNIT 2H  
Farm Name: STEWART, RANDALL  
**API Well Number: 47-1706244**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 06/05/2013

**Promoting a healthy environment.**

# PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

## CONDITIONS

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1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
2. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the fill material shall be within plus or minus 2% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
3. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
4. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
5. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION**

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge New Milton New Milton  
 Operator ID County District Quadrangle

2) Operator's Well Number: Dorothy Unit 2H Well Pad Name: Stewart Pad

3 Elevation, current ground: ~1360' Elevation, proposed post-construction: 1332'

4) Well Type: (a) Gas ☒ Oil ☐  
 Other ☐  
 (b) If Gas: Shallow ☒ Deep ☐  
 Horizontal ☒

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Marcellus Shale: 7400' TVD, Anticipated Thickness-60 Feet, Associated Pressure- 3250#

7) Proposed Total Vertical Depth: 7400' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 18,000' MD

10) Approximate Fresh Water Strata Depths: 317', 362'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 2,345'

13) Approximate Coal Seam Depths: 825', 945', 1167', 1776'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does land contain coal seams tributary or adjacent to, active mine? No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

\*Antero will be air drilling the fresh water string which makes it difficult to determine when freshwater is encountered, therefore we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

17) Describe fracturing/stimulating methods in detail:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 23.32 acres

19) Area to be disturbed for well pad only, less access road (acres): 4.22 acres

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WW - 6B  
(1/12)

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	420'	420' *see above	CTS, 583 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2545'	2545'	CTS, 1036 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18000'	18000'	4523 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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4-29-13

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21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) Proposed borehole conditioning procedures.

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

\*Note: Attach additional sheets as needed.

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WV Department of  
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**CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM**  
**GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE**

Operator Name Antero Resources Appalachian Corporation OP Code 494488557

Watershed Indian Fork Quadrangle New Milton

Elevation 1332' County Doddridge District New Milton

**Description of anticipated Pit Waste:** No pit will be used at this site (Drilling and Flowback Fluids will be stored in tanks. Cuttings will be tanked and hauled off site.)

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes X No       

Will a synthetic liner be used in the pit? N/A. If so, what mil.? N/A

Proposed Disposal Method For Treated Pit Wastes:

- Land Application \_\_\_\_\_  
 Underground Injection ( UIC Permit Number \_\_\_\_\_ )  
 ■ Reuse (at API Number \_\_\_\_\_ Future permitted well locations when applicable. API# will be provided on Form WR-34)  
 ■ Off Site Disposal (Meadowfill Landfill Permit #SWF-1032-98)  
 Other (Explain \_\_\_\_\_)

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Surface - Air/Freshwater, Intermediate - Dust/Stiff Foam, Production - Water Based Mud

-If oil based, what type? Synthetic, petroleum, etc. N/A

Additives to be used? Please See Attachment

Will closed loop system be used ? Yes

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Removed offsite and taken to landfill

-If left in pit and plan to solidify what medium will be used? Cement, lime, N/A

-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-1032-98)

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature \_\_\_\_\_

Company Official (Typed Name) Gerard G. Alberts

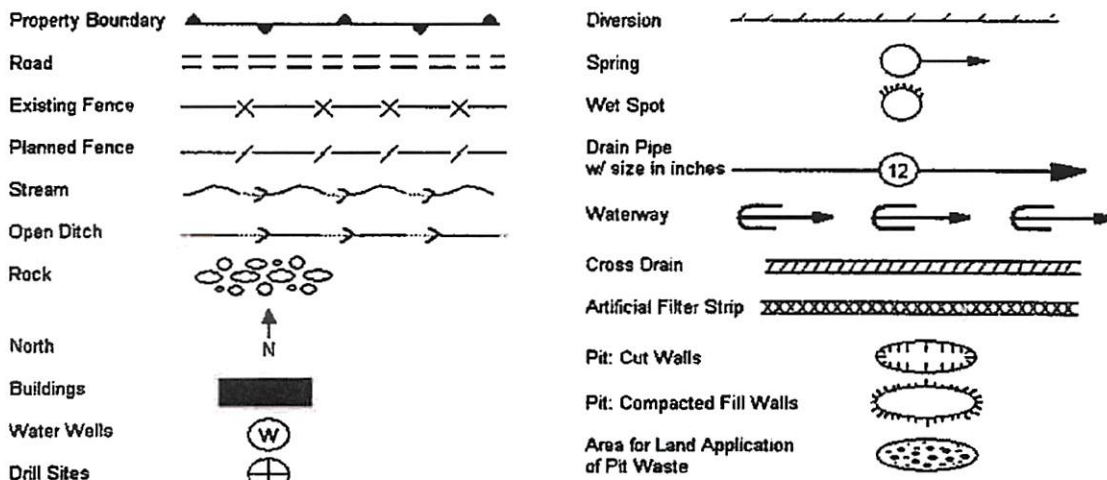
Company Official Title Environmental & Regulatory Manager

Subscribed and sworn before me this 19<sup>th</sup> day of March, 2013

 Notary Public

My commission expires 5/18/2015

SHAUNA REDICAN  
Notary Public  
State of Colorado



Water Tank Offload Pad (0.56) + Access Road A (10.66) + Spoil Pad A (1.65) + Spoil Pad B (0.44) + Gathering/Spoil Pad C (1.42) + Spoil Pad D (0.95) + Drill Pad (4.22) + Water Tank Pad (1.70) + Water Tank Pad Road (1.72) = 23.32 Acres

Proposed Revegetation Treatment: Acres Disturbed 23.32 Prevegetation pH \_\_\_\_\_

Lime 2-4 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch 2-3 Tons/acre Hay or straw or Wood Fiber (will be used where needed)

Seed Mixtures

Seed Type	Area I (Temporary)	Seed Type	Area II (Permanent)
	lbs/acre		lbs/acre
Tall Fescue	45	Tall Fescue	45
Perennial Rye Grass	20	Perennial Rye Grass	20

\*or type of grass seed requested by surface owner

\*or type of grass seed requested by surface owner

Attach:

Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Douglas Newlon

Comments: Preseed & mulch install ETS to DEP regulations

Title: Oil & Gas inspector

Date: 4-29-2013

Field Reviewed? ☒ Yes ☐ No

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## Water Management Plan: Primary Water Sources

WMP- 01130

API/ID Number:

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

**Important:**

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

**DEP is aware that some intake points will be used for multiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interpreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.**

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at [DEP.water.use@wv.gov](mailto:DEP.water.use@wv.gov).

APPROVED MAY 24 2013

## Source Summary

WMP-01130

API Number:

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

## Stream/River

● Source **West Fork River @ JCP Withdrawal** Owner: **James & Brenda Raines**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.320913	-80.337572

☒ Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **2,000** Min. Gauge Reading (cfs): **175.00** Min. Passby (cfs) **146.25**

DEP Comments:

● Source **West Fork River @ McDonald Withdrawal** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.16761	-80.45069

☒ Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **3,000** Min. Gauge Reading (cfs): **175.00** Min. Passby (cfs) **106.30**

DEP Comments:

● Source **West Fork River @ GAL Withdrawal** Owner: **David Shrieves**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.16422	-80.45173

☒ Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **2,000** Min. Gauge Reading (cfs): **175.00** Min. Passby (cfs) **106.30**

DEP Comments:

1706244

● Source **Middle Island Creek @ Dawson Withdrawal**Owner: **Gary D. and Rella A.  
Dawson**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.379292	-80.867803

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>3,000</b>	Min. Gauge Reading (cfs):	<b>76.03</b>	Min. Passby (cfs)	<b>28.83</b>
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DEP Comments:

● Source **McElroy Creek @ Forest Withdrawal**Owner: **Forest C. & Brenda L.  
Moore**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.39675	-80.738197

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>74.77</b>	Min. Passby (cfs)	<b>13.10</b>
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DEP Comments:

● Source **McElroy Creek @ Sweeney Withdrawal**Owner: **Bill Sweeney**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.398123	-80.656808

☐ Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>69.73</b>	Min. Passby (cfs)	<b>6.66</b>
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DEP Comments:



1706244

● Source **Meathouse Fork @ Gagnon Withdrawal**Owner: **George L. Gagnon and  
Susan C. Gagnon**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.26054	-80.720998

☐ Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>71.96</b>	Min. Passby (cfs)	<b>13.10</b>
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DEP Comments:

● Source **Meathouse Fork @ Whitehair Withdrawal**Owner: **Elton Whitehair**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.211317	-80.679592

☐ Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>69.73</b>	Min. Passby (cfs)	<b>7.28</b>
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DEP Comments:

● Source **Tom's Fork @ Erwin Withdrawal**Owner: **John F. Erwin and Sandra E.  
Erwin**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.174306	-80.702992

☐ Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>69.73</b>	Min. Passby (cfs)	<b>0.59</b>
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DEP Comments:

1706244

● Source **Arnold Creek @ Davis Withdrawal**Owner: **Jonathon Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.302006	-80.824561

☐ Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>69.73</b>	Min. Passby (cfs)	<b>3.08</b>
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DEP Comments:

● Source **Buckeye Creek @ Powell Withdrawal**Owner: **Dennis Powell**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.277142	-80.690386

☐ Regulated Stream?      Ref. Gauge ID: **3114500**      MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>69.73</b>	Min. Passby (cfs)	<b>4.59</b>
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DEP Comments:

● Source **South Fork of Hughes River @ Knight Withdrawal**Owner: **Tracy C. Knight & Stephanie C. Knight**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.198369	-80.870969

☐ Regulated Stream?      Ref. Gauge ID: **3155220**      SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm):	<b>3,000</b>	Min. Gauge Reading (cfs):	<b>39.80</b>	Min. Passby (cfs)	<b>1.95</b>
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DEP Comments:

1706244

● Source **North Fork of Hughes River @ Davis Withdrawal**Owner: **Lewis P. Davis and Norma J. Davis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000		39.322363	-80.936771

☐ Regulated Stream?      Ref. Gauge ID: 3155220      SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Max. Pump rate (gpm):	<b>1,000</b>	Min. Gauge Reading (cfs):	<b>35.23</b>	Min. Passby (cfs)	<b>2.19</b>
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DEP Comments:

Source Summary

WMP- 01130

API Number:

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

**Purchased Water**● Source **Middle Island Creek @ Solo Construction**Owner: **Solo Construction, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000	1,000,000	39.399094	-81.185548

☒ Regulated Stream?      Ohio River Min. Flow      Ref. Gauge ID: 9999999      Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm):		Min. Gauge Reading (cfs):	<b>6,468.00</b>	Min. Passby (cfs)	
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DEP Comments:

Elevation analysis indicates that this location has the same elevation as Middle Island Creek's pour point into the Ohio River. As such, it is deemed that water flow at this location is heavily influenced by the Ohio River.

● Source **Sun Valley Public Service District**Owner: **Sun Valley PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
1/23/2014	1/23/2015	10,980,000	200,000	-	-

☒ Regulated Stream?      Stonewall Jackson Dam      Ref. Gauge ID: 3061000      WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm):		Min. Gauge Reading (cfs):	<b>171.48</b>	Min. Passby (cfs)	
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DEP Comments:



## Source Detail

WMP- 01130

API/ID Number:

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

Source ID:

14672

Source Name

Middle Island Creek @ Solo Construction

Solo Construction, LLC

Source Latitude:

39.399094

Source Longitude:

-81.185548

HUC-8 Code:

5030201

Drainage Area (sq. mi.):

25000

County:

Pleasants

Anticipated withdrawal start date:

1/23/2014

Anticipated withdrawal end date:

1/23/2015

Total Volume from Source (gal):

10,980,000

Max. Pump rate (gpm):

☐ Endangered Species?

☒ Mussel Stream?

☐ Trout Stream?

☐ Tier 3?

☒ Regulated Stream?

Ohio River Min. Flow

☒ Proximate PSD?

City of St. Marys

☒ Gauged Stream?

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

0

Reference Gaug

9999999

Ohio River Station: Willow Island Lock &amp; Dam

Drainage Area (sq. mi.)

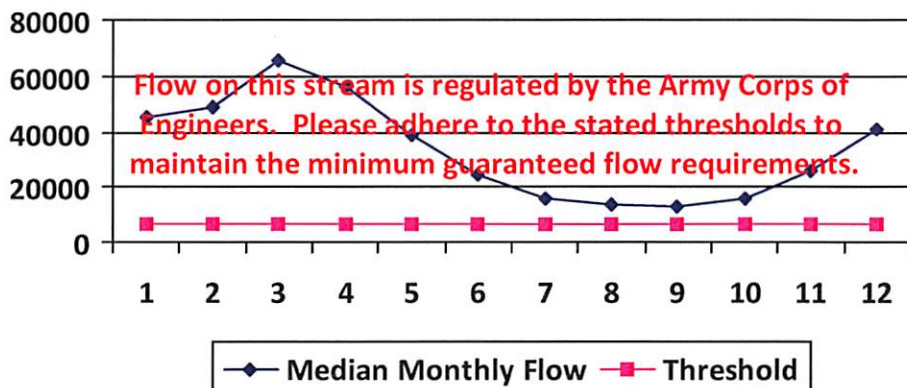
25,000.00

Gauge Threshold (cfs):

6468

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-

## Water Availability Profile



## Water Availability Assessment of Location

Base Threshold (cfs):

-

Upstream Demand (cfs):

0.00

Downstream Demand (cfs):

0.00

Pump rate (cfs):

Headwater Safety (cfs):

0.00

Ungauged Stream Safety (cfs):

0.00

Min. Gauge Reading (cfs):

-

Passby at Location (cfs):

-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

Source ID: 14673 Source Name: Sun Valley Public Service District  
Sun Valley PSD

Source Latitude: -

Source Longitude: -

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 391.85 County: Harrison

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm):

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm):

☐ Endangered Species? ☒ Mussel Stream?☐ Trout Stream?☐ Tier 3?☒ Regulated Stream?

Stonewall Jackson Dam

☐ Proximate PSD?☒ Gauged Stream?

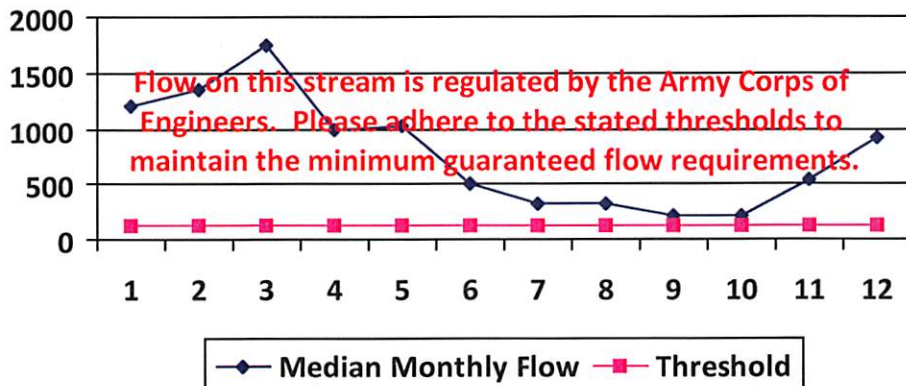
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,200.75	-	-
2	1,351.92	-	-
3	1,741.33	-	-
4	995.89	-	-
5	1,022.23	-	-
6	512.21	-	-
7	331.86	-	-
8	316.87	-	-
9	220.48	-	-
10	216.17	-	-
11	542.45	-	-
12	926.12	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14659 Source Name: West Fork River @ JCP Withdrawal  
James & Brenda Raines

Source Latitude: 39.320913

Source Longitude: -80.337572

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 532.2 County: Harrison

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 2,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☒ Regulated Stream? Stonewall Jackson Dam

☐ Proximate PSD?

☒ Gauged Stream?

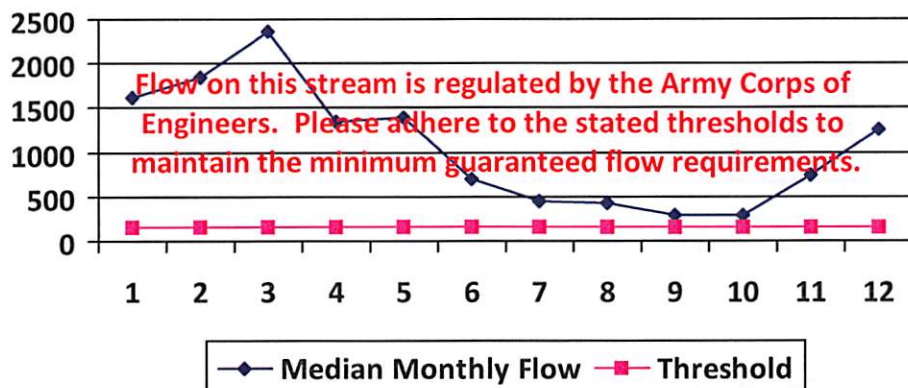
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,630.82	-	-
2	1,836.14	-	-
3	2,365.03	-	-
4	1,352.59	-	-
5	1,388.37	-	-
6	695.67	-	-
7	450.73	-	-
8	430.37	-	-
9	299.45	-	-
10	293.59	-	-
11	736.74	-	-
12	1,257.84	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 4.46

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14660 Source Name: West Fork River @ McDonald Withdrawal  
David Shrieves

Source Latitude: 39.16761

Source Longitude: -80.45069

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 314.91 County: Harrison

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 3,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☒ Regulated Stream? Stonewall Jackson Dam

☐ Proximate PSD?

☒ Gauged Stream?

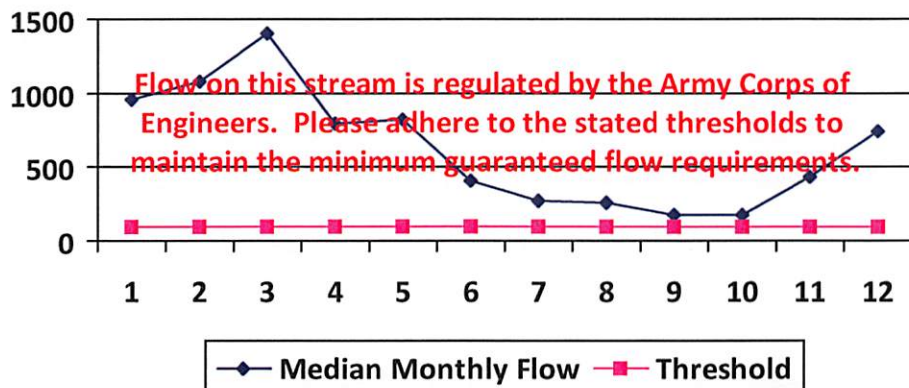
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	964.98	-	-
2	1,086.47	-	-
3	1,399.42	-	-
4	800.34	-	-
5	821.52	-	-
6	411.64	-	-
7	266.70	-	-
8	254.66	-	-
9	177.19	-	-
10	173.72	-	-
11	435.94	-	-
12	744.28	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 6.68

Headwater Safety (cfs): 24.27

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14661 Source Name: West Fork River @ GAL Withdrawal  
David Shrieves

Source Latitude: 39.16422

Source Longitude: -80.45173

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 313.67 County: Harrison

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 2,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☒ Regulated Stream? Stonewall Jackson Dam

☐ Proximate PSD?

☒ Gauged Stream?

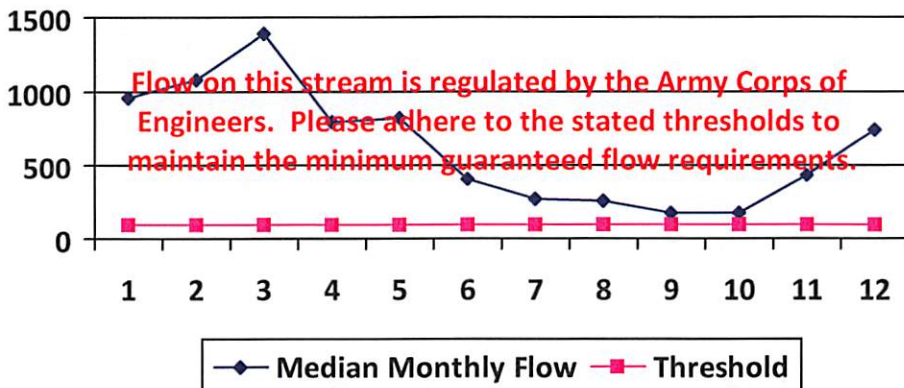
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	961.18	-	-
2	1,082.19	-	-
3	1,393.91	-	-
4	797.19	-	-
5	818.28	-	-
6	410.02	-	-
7	265.65	-	-
8	253.65	-	-
9	176.49	-	-
10	173.04	-	-
11	434.22	-	-
12	741.35	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs): 24.29

Downstream Demand (cfs): 0.00

Pump rate (cfs): 4.46

Headwater Safety (cfs): 24.18

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): -

Passby at Location (cfs): -

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14662 Source Name: Middle Island Creek @ Dawson Withdrawal  
Gary D. and Rella A. Dawson

Source Latitude: 39.379292

Source Longitude: -80.867803

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 181.34 County: Tyler

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 3,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☒ Gauged Stream?

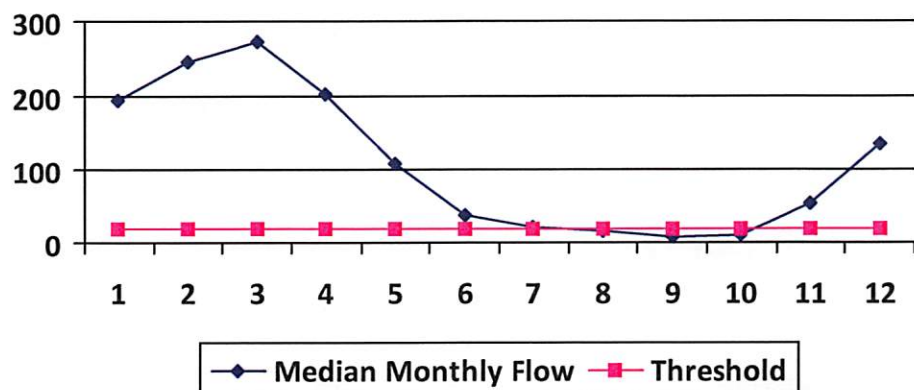
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	194.47	42.06	152.68
2	244.62	42.06	202.83
3	273.72	42.06	231.93
4	203.26	42.06	161.47
5	107.22	42.06	65.43
6	37.44	42.06	-4.35
7	21.19	42.06	-20.60
8	17.45	42.06	-24.34
9	8.94	42.06	-32.85
10	11.23	42.06	-30.56
11	54.82	42.06	13.04
12	133.96	42.06	92.17

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 17.82

Upstream Demand (cfs): 13.10

Downstream Demand (cfs): 6.55

Pump rate (cfs): 6.68

Headwater Safety (cfs): 4.45

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 76.03

Passby at Location (cfs): 28.82

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14663 Source Name: McElroy Creek @ Forest Withdrawal  
Forest C. & Brenda L. Moore

Source Latitude: 39.39675

Source Longitude: -80.738197

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 88.85 County: Tyler

- ☐ Endangered Species? ☐ Mussel Stream?  
☐ Trout Stream? ☐ Tier 3?  
☐ Regulated Stream?  
☐ Proximate PSD?  
☐ Gauged Stream?

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

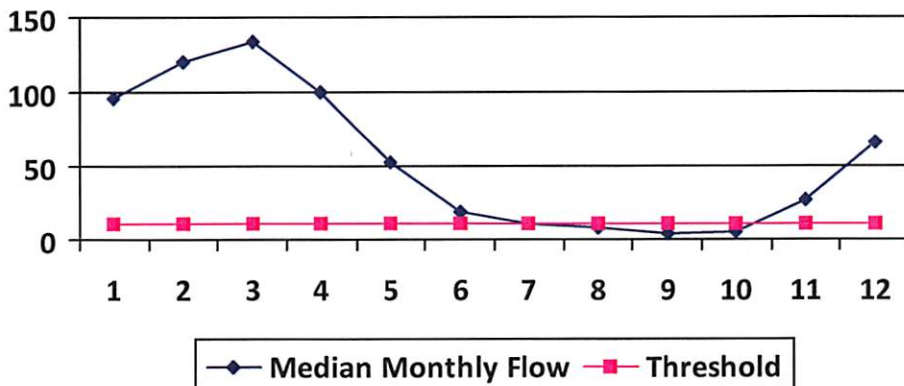
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	95.28	19.78	75.68
2	119.86	19.78	100.25
3	134.11	19.78	114.51
4	99.59	19.78	79.99
5	52.54	19.78	32.93
6	18.35	19.78	-1.26
7	10.38	19.78	-9.22
8	8.55	19.78	-11.05
9	4.38	19.78	-15.23
10	5.50	19.78	-14.10
11	26.86	19.78	7.26
12	65.63	19.78	46.03

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 8.73

Upstream Demand (cfs): 4.46

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 2.18

Ungauged Stream Safety (cfs): 2.18

Min. Gauge Reading (cfs): 74.19

Passby at Location (cfs): 13.09

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14664 Source Name: McElroy Creek @ Sweeney Withdrawal  
Bill Sweeney

Source Latitude: 39.398123

Source Longitude: -80.656808

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 45.16 County: Doddridge

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☒ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

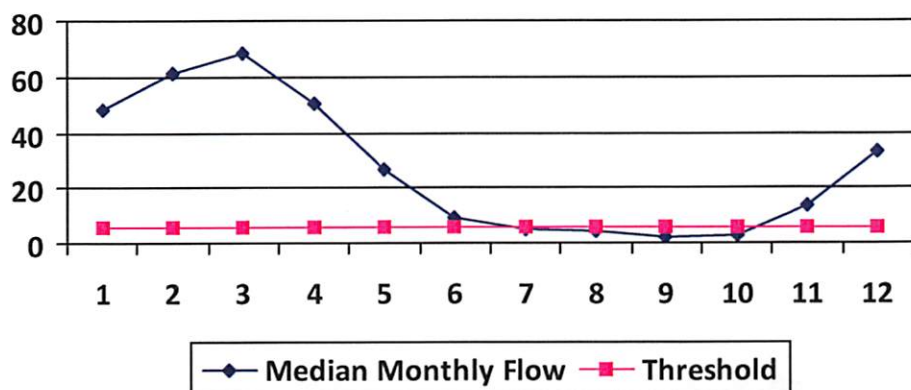
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	48.43	8.88	39.93
2	60.92	8.88	52.42
3	68.17	8.88	59.67
4	50.62	8.88	42.12
5	26.70	8.88	18.21
6	9.32	8.88	0.83
7	5.28	8.88	-3.22
8	4.34	8.88	-4.15
9	2.23	8.88	-6.27
10	2.80	8.88	-5.70
11	13.65	8.88	5.16
12	33.36	8.88	24.86

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 4.44

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 1.11

Ungauged Stream Safety (cfs): 1.11

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 6.66

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14665 Source Name: Meathouse Fork @ Gagnon Withdrawal  
George L. Gagnon and Susan C. Gagnon

Source Latitude: 39.26054

Source Longitude: -80.720998

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 60.6 County: Doddridge

☒ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream?

☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

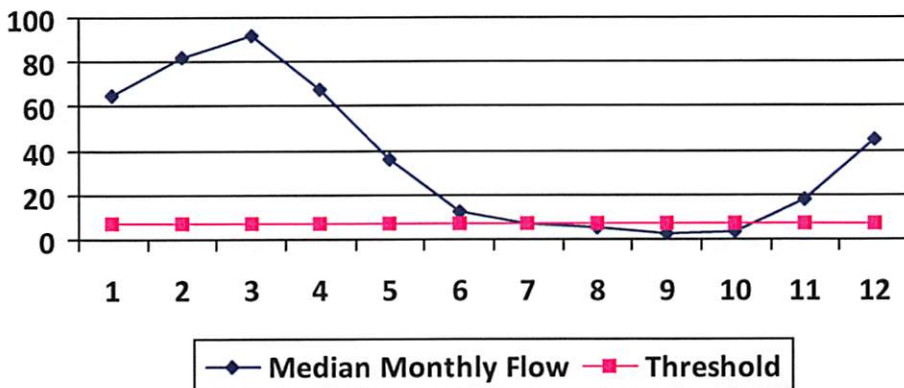
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	64.99	13.39	51.70
2	81.75	13.39	68.46
3	91.47	13.39	78.19
4	67.93	13.39	54.64
5	35.83	13.39	22.55
6	12.51	13.39	-0.77
7	7.08	13.39	-6.20
8	5.83	13.39	-7.45
9	2.99	13.39	-10.30
10	3.75	13.39	-9.53
11	18.32	13.39	5.04
12	44.76	13.39	31.48

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 5.95

Upstream Demand (cfs): 2.23

Downstream Demand (cfs): 2.81

Pump rate (cfs): 2.23

Headwater Safety (cfs): 1.49

Ungauged Stream Safety (cfs): 1.49

Min. Gauge Reading (cfs): 71.96

Passby at Location (cfs): 11.74

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14666 Source Name: Meathouse Fork @ Whitehair Withdrawal  
Elton Whitehair

Source Latitude: 39.211317

Source Longitude: -80.679592

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 30.37 County: Doddridge

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☒ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream?

☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

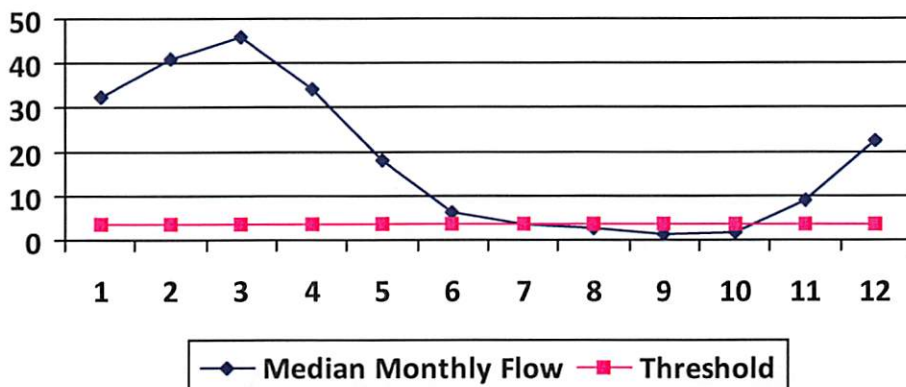
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	32.57	6.70	26.15
2	40.97	6.70	34.55
3	45.84	6.70	39.42
4	34.04	6.70	27.62
5	17.96	6.70	11.54
6	6.27	6.70	-0.15
7	3.55	6.70	-2.87
8	2.92	6.70	-3.50
9	1.50	6.70	-4.92
10	1.88	6.70	-4.54
11	9.18	6.70	2.76
12	22.43	6.70	16.01

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 2.98

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 2.81

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.75

Ungauged Stream Safety (cfs): 0.75

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 7.29

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

Source ID: 14667 Source Name: Tom's Fork @ Erwin Withdrawal  
John F. Erwin and Sandra E. Erwin

Source Latitude: 39.174306

Source Longitude: -80.702992

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 4.01 County: Doddridge

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

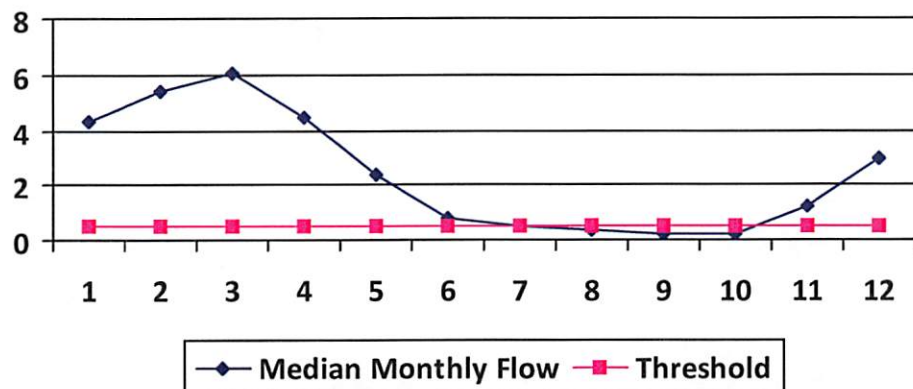
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	4.30	2.82	1.88
2	5.41	2.82	2.98
3	6.05	2.82	3.63
4	4.49	2.82	2.07
5	2.37	2.82	-0.05
6	0.83	2.82	-1.60
7	0.47	2.82	-1.96
8	0.39	2.82	-2.04
9	0.20	2.82	-2.23
10	0.25	2.82	-2.18
11	1.21	2.82	-1.21
12	2.96	2.82	0.54

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 0.39

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.10

Ungauged Stream Safety (cfs): 0.10

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 0.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14668 Source Name: Arnold Creek @ Davis Withdrawal  
Jonathon Davis

Source Latitude: 39.302006

Source Longitude: -80.824561

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 20.83 County: Doddridge

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

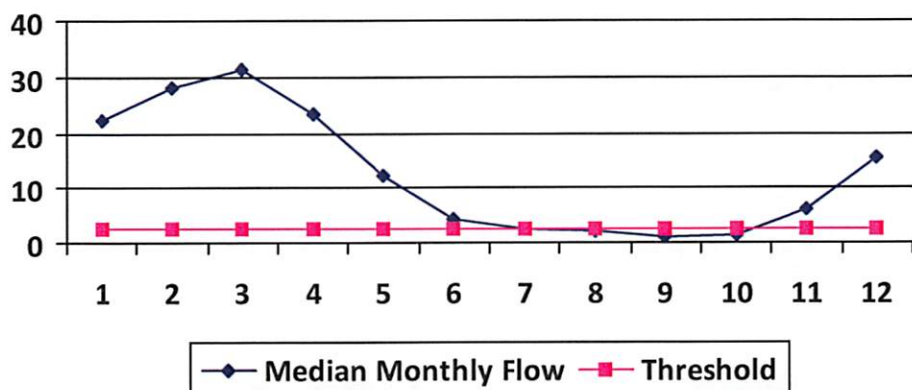
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	22.34	5.30	17.29
2	28.10	5.30	23.05
3	31.44	5.30	26.39
4	23.35	5.30	18.30
5	12.32	5.30	7.26
6	4.30	5.30	-0.75
7	2.43	5.30	-2.62
8	2.00	5.30	-3.05
9	1.03	5.30	-4.03
10	1.29	5.30	-3.76
11	6.30	5.30	1.25
12	15.39	5.30	10.34

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 2.05

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.51

Ungauged Stream Safety (cfs): 0.51

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 3.07

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14669 Source Name: Buckeye Creek @ Powell Withdrawal  
Dennis Powell

Source Latitude: 39.277142

Source Longitude: -80.690386

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 31.15 County: Doddridge

☐ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream? ☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☐ Gauged Stream?

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

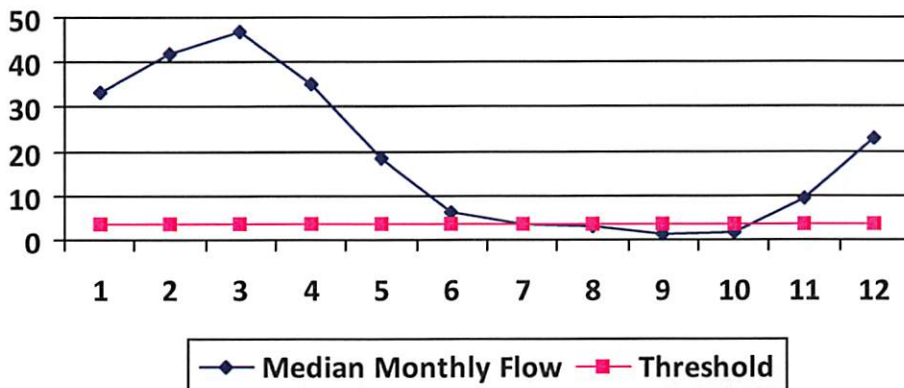
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	33.41	6.82	26.95
2	42.02	6.82	35.56
3	47.02	6.82	40.56
4	34.92	6.82	28.46
5	18.42	6.82	11.96
6	6.43	6.82	-0.03
7	3.64	6.82	-2.82
8	3.00	6.82	-3.46
9	1.53	6.82	-4.92
10	1.93	6.82	-4.53
11	9.42	6.82	2.96
12	23.01	6.82	16.55

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 3.06

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.77

Ungauged Stream Safety (cfs): 0.77

Min. Gauge Reading (cfs): 69.73

Passby at Location (cfs): 4.59

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.



## Source Detail

WMP- 01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14670 Source Name: South Fork of Hughes River @ Knight Withdrawal  
Tracy C. Knight & Stephanie C. Knight

Source Latitude: 39.198369

Source Longitude: -80.870969

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 16.26 County: Ritchie

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 3,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

☒ Endangered Species? ☒ Mussel Stream?

☐ Trout Stream?

☐ Tier 3?

☐ Regulated Stream?

☐ Proximate PSD?

☒ Gauged Stream?

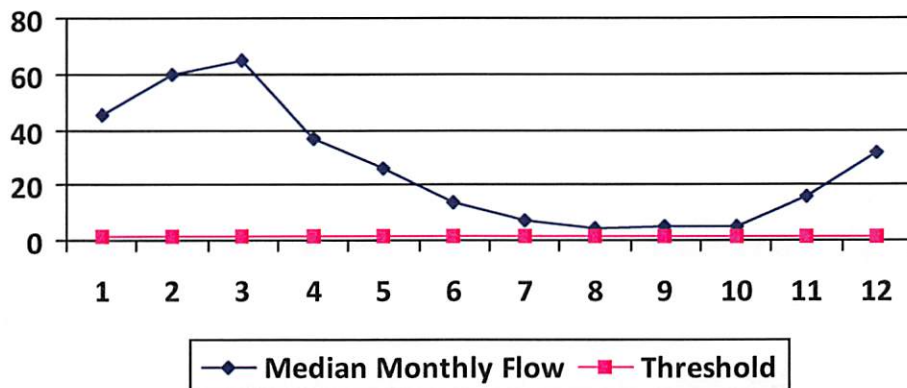
Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	45.67	14.26	31.44
2	59.55	14.26	45.31
3	65.21	14.26	50.97
4	36.87	14.26	22.63
5	25.86	14.26	11.63
6	13.90	14.26	-0.33
7	6.89	14.26	-7.34
8	3.98	14.26	-10.25
9	4.79	14.26	-9.45
10	5.20	14.26	-9.04
11	15.54	14.26	1.30
12	32.06	14.26	17.82

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 1.56

Upstream Demand (cfs): 5.62

Downstream Demand (cfs): 0.00

Pump rate (cfs): 6.68

Headwater Safety (cfs): 0.39

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 39.80

Passby at Location (cfs): 1.95

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

## Source Detail

WMP-01130

API/ID Number: 047-017-06244

Operator: Antero Resources

Dorothy Unit 2H

Source ID: 14671 Source Name: North Fork of Hughes River @ Davis Withdrawal  
Lewis P. Davis and Norma J. Davis

Source Latitude: 39.322363  
Source Longitude: -80.936771

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 15.18 County: Ritchie

Anticipated withdrawal start date: 1/23/2014

Anticipated withdrawal end date: 1/23/2015

Total Volume from Source (gal): 10,980,000

Max. Pump rate (gpm): 1,000

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

- ☒ Endangered Species? ☒ Mussel Stream?  
☐ Trout Stream? ☐ Tier 3?  
☐ Regulated Stream?  
☐ Proximate PSD?  
☐ Gauged Stream?

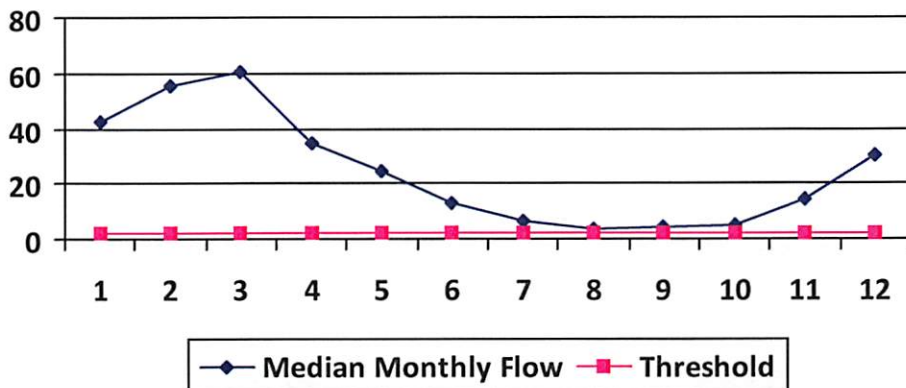
Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	42.64	4.42	38.36
2	55.59	4.42	51.32
3	60.88	4.42	56.60
4	34.42	4.42	30.14
5	24.15	4.42	19.87
6	12.98	4.42	8.70
7	6.44	4.42	2.16
8	3.72	4.42	-0.56
9	4.47	4.42	0.19
10	4.85	4.42	0.57
11	14.50	4.42	10.23
12	29.93	4.42	25.65

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 1.46

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.23

Headwater Safety (cfs): 0.36

Ungauged Stream Safety (cfs): 0.36

Min. Gauge Reading (cfs): 35.23

Passby at Location (cfs): 2.19

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.





## Water Management Plan: Secondary Water Sources



WMP-01130

API/ID Number

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

### Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

### Lake/Reservior

Source ID:	14674	Source Name	City of Salem Reservior (Lower Dog Run)		Source start date:	1/23/2014
			Public Water Provider		Source end date:	1/23/2015
Source Lat:	39.28834	Source Long:	-80.54966	County	Harrison	
Max. Daily Purchase (gal)	1,000,000	Total Volume from Source (gal):	10,980,000			
DEP Comments:						

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.

- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

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Source ID:	14675	Source Name	Pennsboro Lake	Source start date:	1/23/2014	
				Source end date:	1/23/2015	
	Source Lat:	39.281689	Source Long:	-80.925526	County	Ritchie
	Max. Daily Purchase (gal)			Total Volume from Source (gal):	10,980,000	
DEP Comments:						

---

Source ID:	14676	Source Name	Powers Lake (Wilderness Water Park Dam)	Source start date:	1/23/2014	
			Private Owner	Source end date:	1/23/2015	
	Source Lat:	39.255752	Source Long:	-80.463262	County	Harrison
	Max. Daily Purchase (gal)			Total Volume from Source (gal):	10,980,000	
DEP Comments:						

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**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:	14677	Source Name	Powers Lake Two		Source start date:	1/23/2014
					Source end date:	1/23/2015
	Source Lat:	39.247604	Source Long:	-80.466642	County	Harrison
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	10,980,000		
DEP Comments:						



WMP-01130

API/ID Number

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

**Other**

Source ID:	14678	Source Name	Poth Lake (Landowner Pond)	Source start date:	1/23/2014
			Private Owner	Source end date:	1/23/2015
Source Lat:	39.221306	Source Long:	-80.463028	County	Harrison
Max. Daily Purchase (gal)		Total Volume from Source (gal):	10,980,000		
DEP Comments:					

Source ID:	14679	Source Name	Williamson Pond (Landowner Pond)	Source start date:	1/23/2014
				Source end date:	1/23/2015
Source Lat:	39.19924	Source Long:	-80.886161	County	Ritchie
Max. Daily Purchase (gal)		Total Volume from Source (gal):	10,980,000		
DEP Comments:					

WMP-01130

API/ID Number

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID:	14680	Source Name	Eddy Pond (Landowner Pond)		Source start date:	1/23/2014
					Source end date:	1/23/2015
Source Lat:	39.19924	Source Long:	-80.886161	County	Ritchie	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	10,980,000			
DEP Comments:						

Source ID:	14681	Source Name	Hog Lick Quarry		Source start date:	1/23/2014
			Industrial Facility		Source end date:	1/23/2015
Source Lat:	39.419272	Source Long:	-80.217941	County	Marion	
Max. Daily Purchase (gal)	1,000,000	Total Volume from Source (gal):	10,980,000			
DEP Comments:						

WMP-01130

API/ID Number

047-017-06244

Operator:

Antero Resources

Dorothy Unit 2H

**Important:**

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

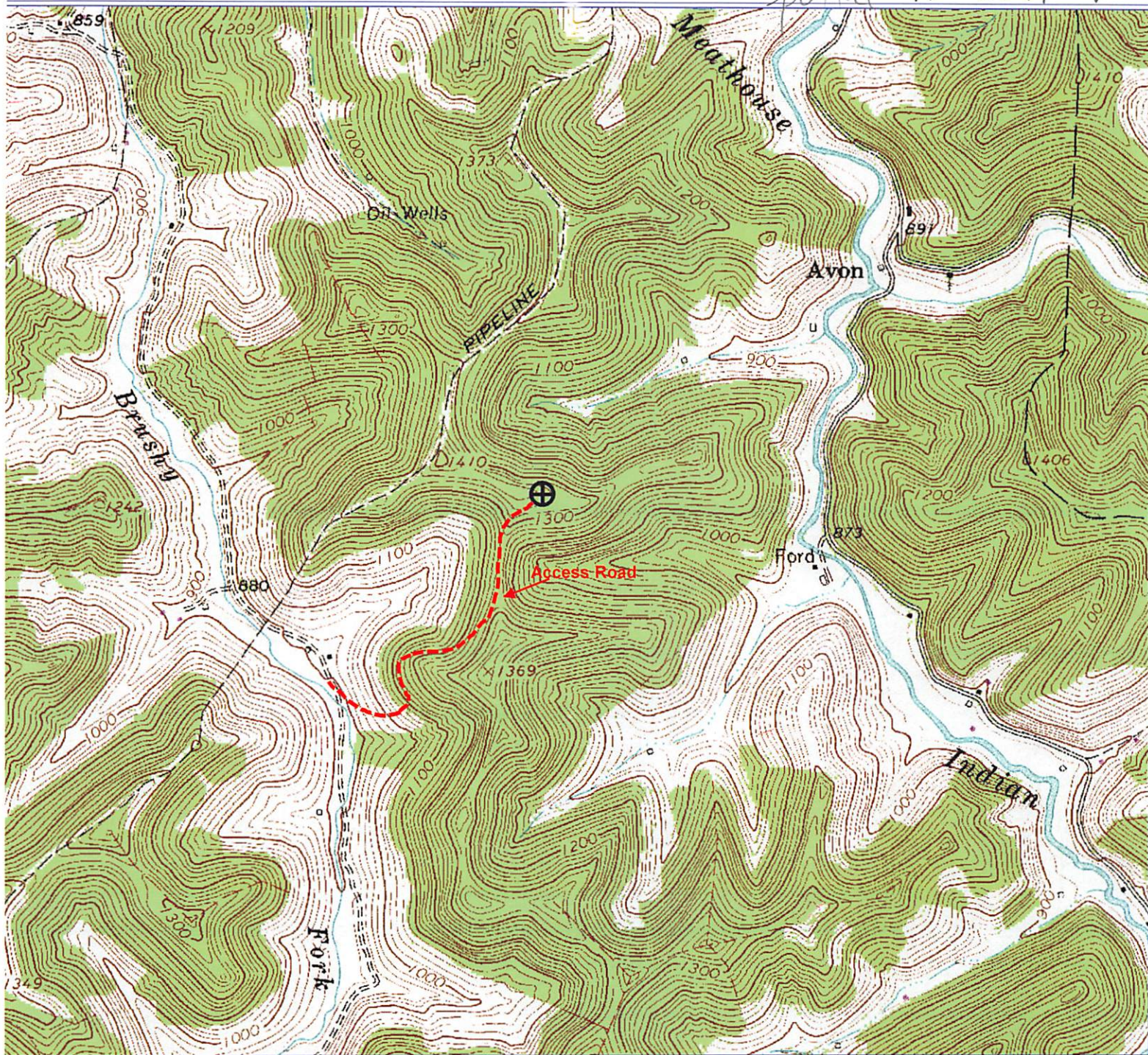
Source ID:	14682	Source Name	Glade Fork Mine Industrial Facility		Source start date:	1/23/2014
					Source end date:	1/23/2015
Source Lat:	38.965767	Source Long:	-80.299313	County	Upshur	
Max. Daily Purchase (gal)	1,000,000	Total Volume from Source (gal):	10,980,000			
DEP Comments:						

**Recycled Frac Water**

Source ID:	14683	Source Name	Crislip Unit 2H		Source start date:	1/23/2014
					Source end date:	1/23/2015
Source Lat:		Source Long:		County		
Max. Daily Purchase (gal)		Total Volume from Source (gal):	10,980,000			
DEP Comments:						



Spotted 17-06244 ✓



PETRA 3/18/2013 2:40:12 PM

**Antero Resources**

Appalachian Basin

Dorothy Unit 2H

Doddridge County



**REMARKS**

Quadrangle: New Milton  
Watershed: Toms Fork Meathouse Fork  
District: New Milton

March 18, 2013

RECEIVED  
Office of Oil and Gas  
MAR 28 2013  
Environmental Protection



LATITUDE 39°12'30"

10,333'

6,006' TO BOTTOM HOLE

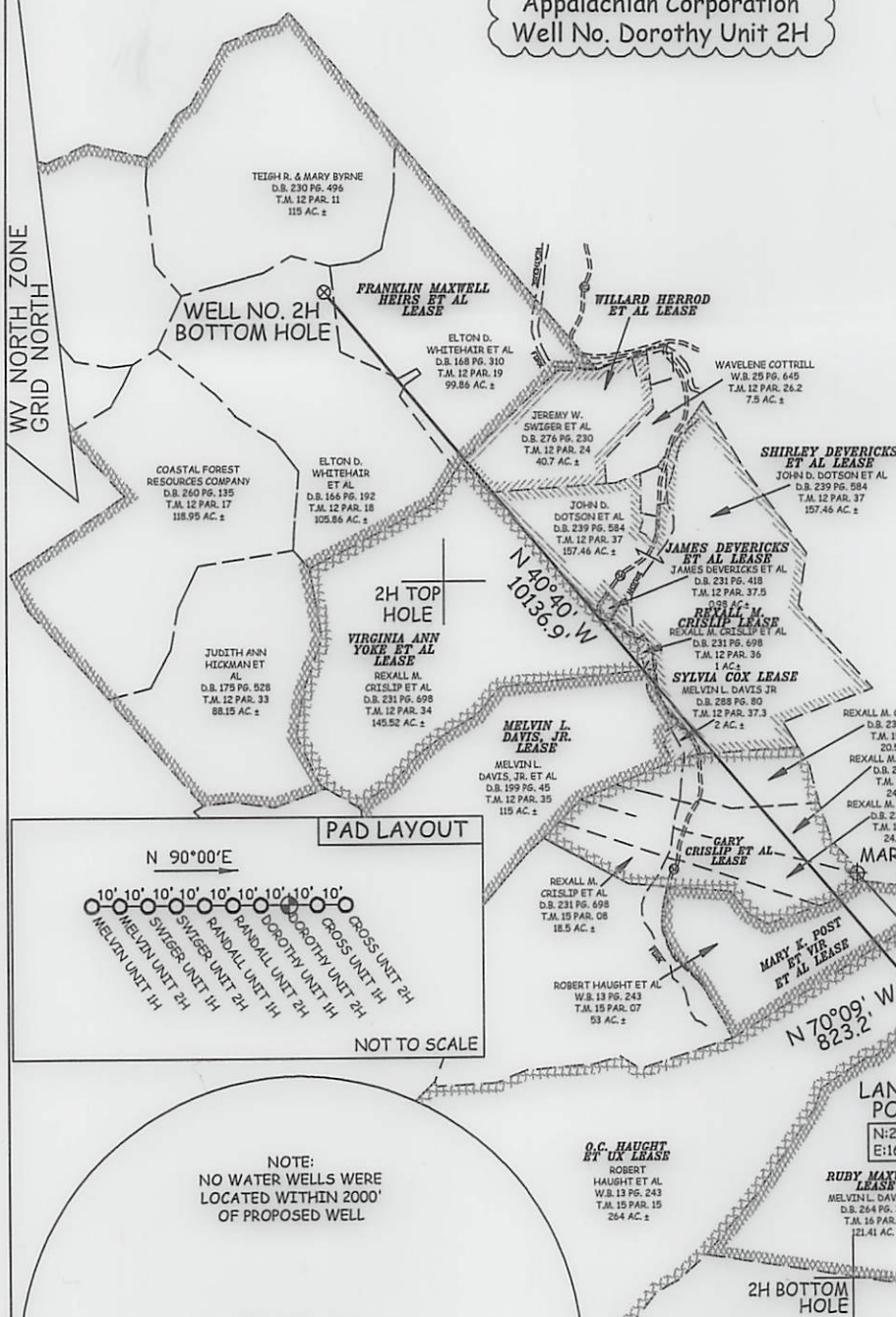
LATITUDE 39°15'00"

LONGITUDE 80°40'00"

7,205'

LONGITUDE 80°37'30"

14,510' TO BOTTOM HOLE

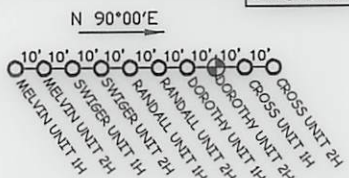
Antero Resources  
Appalachian Corporation  
Well No. Dorothy Unit 2HWV NORTH ZONE  
GRID NORTH

NOTES:

WELL 2H TOP HOLE INFORMATION:  
N: 252,913ft E: 1,670,795ft  
LAT: 39°11'18.79" N: 260,881ft E: 1,663,415ft  
LAT: 39°12'36.59" N: 260,881ft E: 1,663,415ft  
WEST VIRGINIA COORDINATE  
SYSTEM OF 1927 NORTH ZONE.  
ZONE WAS DERIVED FROM  
MEASUREMENTS TAKEN WITH  
TRIMBLE GEOXT SUBMETER  
MAPPING GRADE GPS UNIT.  
PLAT ORIENTATION, CORNER,  
AND WELL REFERENCE TIE LINES  
ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:  
WELL 2H TOP HOLE INFORMATION:  
N: 4,337,765m E: 529,253m  
BOTTOM HOLE INFORMATION:  
N: 4,340,155m E: 526,964m

## PAD LAYOUT



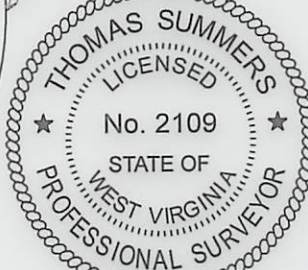
NOT TO SCALE

NOTE:  
NO WATER WELLS WERE  
LOCATED WITHIN 2000'  
OF PROPOSED WELL

WELL NO. 2H  
3134

3130

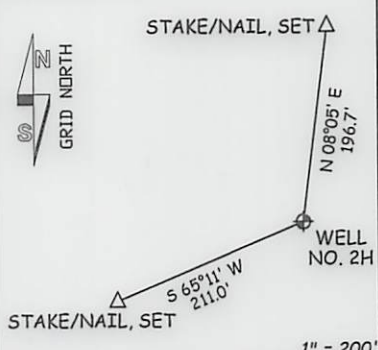
2716



2H BOTTOM HOLE

LANDING POINT  
N: 253192  
E: 1670021RUBY MAXWELL  
LEASE  
MELVIN L. DAVIS JR.  
D.B. 231 PG. 324  
T.M. 15 PAR. 10  
21.41 AC. ±

## REFERENCES



JOB # 12-119WA  
DRAWING # DOROTHY2HR2  
SCALE 1" = 2000'  
MINIMUM DEGREE OF  
ACCURACY SUBMETER  
PROVEN SOURCE OF ELEV.  
SUBMETER MAPPING GRADE GPS

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENERGY  
DIVISION OF OIL AND GAS  
WELL TYPE: OIL GAS ☒ LIQUID INJECTION ☐ WASTE DISPOSAL ☐  
(IF "GAS") PRODUCTION ☒ STORAGE ☐ DEEP ☐ SHALLOW ☒  
LOCATION: ELEVATION 1,332' WATERSHED INDIAN FORK  
QUADRANGLE NEW MILTON 7.5'

SURFACE OWNER RANDALL STEWART  
OIL & GAS ROYALTY OWNER RANDALL P. STEWART, ET AL.; A. ROSALIE CLARK; RUBY MAXWELL; O.C. HAUGHT, ET UX;  
MARY K. POST ET VIR; GARY CRISLIP ET AL.; SHIRLEY DEVERICKS ET AL.; MELVIN L. DAVIS JR.; VIRGINIA ANN YOKE ET AL.; WILLARD HERROD ET AL.; FRANKLIN MAXWELL HEIRS ET AL.  
PROPOSED WORK: DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☒  
PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☒ OTHER PHYSICAL CHANGE IN WELL  
(SPECIFY) ☐ PLUG & ABANDON ☐ CLEAN OUT & REPLUG  
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,400' TVD 18,000' MD

WELL OPERATOR ANTERO RESOURCES APPALACHIAN CORP.  
ADDRESS 1625 17TH STREET  
DENVER, CO 80202

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT  
TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE  
INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND  
PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION  
OF ENVIRONMENTAL PROTECTION,  
OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC  
266 HUSHERS RUN RD PENNSBORO  
WEST VIRGINIA 26415

## LEGEND

----- Surface Owner Boundary Lines +/-  
----- Interior Surface Tracts +/-  
----- Existing Fence  
Found monument, as noted

THOMAS SUMMERS P.S. 2109

DATE 03/14/13

OPERATOR'S WELL # DOROTHY UNIT #2H

API WELL # 47 - 017 - 06244 H6A  
STATE COUNTY PERMIT

DISTRICT NEW MILTON COUNTY DODDRIDGE

ACREAGE 105.1 ACRES +/-

LEASE ACREAGE 195 ACRES +/- 141.46 ACRES +/- 121 ACRES +/- 264 ACRES +/-

53 ACRES +/- 88 ACRES +/- 157 ACRES +/- 115 ACRES +/- 145 ACRES +/- 43 ACRES +/- 580 ACRES +/-

DIANNA STAMPER

CT CORPORATION SYSTEM

5400 D BIG TYLER ROAD

CHARLESTON, WV 25313